LOSS OF AQUATIC ECOSYSTEMS

BACKGROUND

Wetlands provide essential habitat for feeding, nesting, cover and breeding for birds, fish, amphibians, and reptiles. The Department of Fish and Wildlife lists over 175 wildlife species that use wetlands for primary feeding habitat and 140 species that use them for primary breeding habitat. At least one-third of Washington's threatened and endangered species require wetlands to survive.

The Puget Sound Plan identified other important benefits for human communities, including the slowing and storage of flood water, cleansing water of certain pollutants, recharging ground water and serving as an outlet for ground water to recharge streams (ground water discharge), and providing recreational areas. In their natural state, wetlands help decrease the need for costly stormwater facilities and flood protection measures such as levees and dikes. Continued habitat loss due to hardening of marine shorelines is still a major concern. New State shoreline guidelines to address this issue are due out soon.

Riparian areas are also areas of abundant biota. In addition, the riparian zone protects the adjacent stream or river. The canopy of the riparian area provides shade to cool the stream, nutrients from exfoliation, and habitat for insects and other life forms important in the aquatic food web. The riparian area also prevents or lessens erosion and sedimentation.

NONPOINT POLLUTION ASSOCIATED WITH LOSS OF AQUATIC ECOSYSTEMS

Damage or destruction of riparian areas is a large cause of impairment to the streams in the state. Many of these streams once hosted abundant salmon runs and other fish and wildlife. Deforestation of the foothills and development of the lowlands and valleys of the coastal zone have caused environmental degradation.

Wetlands and riparian areas can play a critical role in reducing nonpoint source pollution, by intercepting surface runoff, subsurface flow, and certain ground water flows. Their role in water quality improvement includes processing, removing, transforming, and storing pollutants such as sediment, nitrogen, phosphorus, and certain heavy metals. Wetlands and riparian areas buffer receiving waters from the effects of pollutants, or they prevent the entry of pollutants into receiving waters.

The functions of wetlands and riparian areas include water quality improvement, aquatic habitat, stream shading, flood attenuation, shoreline stabilization, and ground water exchange. Wetlands and riparian areas typically occur as natural buffers between uplands and adjacent water bodies. Loss of these systems allows for a more direct contribution of nonpoint source pollution to receiving waters (USEPA, 1993).

1998 FINDING BY NOAA AND EPA

Findings:
Washington's program does not include management measures in conformity with the 6217(g) guidance. Washington has identified enforceable authorities, as well as recommended actions in the State's Wetlands Integration Strategy, which could implement the management
measures, but has not yet demonstrated the ability of the authorities or its programs to ensure implementation of the management measures throughout the 6217 management area.

Condition:
Within three years, Washington will include in its program management measures in conformity with the 6217(g) guidance to protect wetlands and riparian areas, promote restoration of wetlands and riparian areas and promote the use of vegetative treatment systems. Within one year, Washington will develop a strategy (in accordance with Section XIII, page 14) to implement the wetlands, riparian areas and vegetated treatment systems management measures throughout the 6217 management area.

Rationale:
Washington's program does not include management measures in conformity with the 6217(g) guidance for protection of wetlands and riparian areas, for promoting restoration of wetlands and riparian areas, or for promoting the use of vegetated treatment systems. The state's program submittal identifies several mechanisms that could be used for implementing the management measures. These include: (i) the Hydraulic Act and (ii) the State Environmental Policy Act (discussed in the preceding section) (iii) the Shoreline Management Act, which requires master plans be developed by local governments to provide an objective guide for regulating the use of shorelines; (iv) the Growth Management Act, which requires regulations for new development to assure conservation of agricultural and forest resources; and, (v) the Water Pollution Control Act, which provides for water quality standards for wetlands.

NOAA and EPA recognize that these mechanisms, along with the recommendations contained in the Wetlands Integration Strategy (SWIS) have potential to ensure some degree of implementation of the management measures; however, the state's submittal provides no details on how these mechanisms will be utilized to achieve implementation of the management measures. The state needs to demonstrate the ability of its authorities, programs, and initiatives to ensure implementation of management measures for wetlands, riparian areas, and vegetated treatment systems throughout the 6217 management area.

DESCRIPTION OF CURRENT PROGRAM

There are three management measures in this category:

IIa Protect Wetlands and Riparian Areas
IIb Restore Wetlands and Riparian Areas
IIc Vegetative Treatment Systems

In addition to wetlands and riparian areas, we will present a discussion on lakes and estuaries in this section.

Washington believes that existing state and local programs meet the requirements for the three management measures described above.

EFFORTS TO IMPROVE AQUATIC ECOSYSTEM PROTECTION PROGRAMS IN WASHINGTON

The overarching goal of the wetlands program is to ensure no net loss of the functions and acreage of wetlands. The program calls upon local jurisdictions to restore and protect wetlands through a variety of mechanisms, including land use controls, acquisition and preservation programs, and restoration projects, in order to preserve habitat, help with flood control, and protect water quality. The program also calls for inventories, education, research, and interagency coordination.

In 1986, wetlands were regulated at the federal level primarily through Section 404 of the Clean Water Act, administered by the U.S. Army Corps of Engineers (COE) and the Environmental Protection Agency (EPA). At the state level, the Hydraulic Code and Shoreline Management Act were the primary regulations for activities involving wetlands. In some areas, local regulations also applied. The State Environmental Policy Act (SEPA), Coastal Zone Management Act and Clean Water Act Section 401 certifications also were used to some extent to review activities that may affect wetlands. Improper interpretation of regulations, imperfect science in estimating impacts, inappropriate mitigation, and the exemption of many land uses from regulation all contribute to further loss and decline.

Several efforts to enact a law to require state wetland standards failed. Subsequently, the 1990 Growth Management Act (GMA) and its amendments required that local governments identify and protect critical areas, including wetlands, within their jurisdiction. Several problems arose with the creation of local ordinances. Each local government adopts its own ordinances. The Puget Sound Plan Water Quality Plan contains specific elements addressing wetlands in the Puget Sound Region. Other areas of Washington state do not.

Although the GMA increased local government involvement in wetlands regulations, it did not decrease the involvement of state and federal agencies. The additional requirements of local government added confusion to an already complex permit system. In 1992, the Corps of Engineers adopted regional conditions for nationwide permits, which established more restrictive regulations for the discharge of dredged or fill material which would affect more than one acre of headwaters or isolated wetlands. Regional conditions on a new round of Corps nationwide permits are currently being discussed.

Water quality protection for wetlands is authorized under the Washington State Water Pollution Control Act (RCW 90.48.020) and the antidegradation policy (WAC 173-201A-070). Although Washington state has not developed specific standards for wetlands in the water quality standards, a 1993 Superior Court decision clarified Ecology's authority over wetlands as waters of the state. These policies state that discharges to wetlands must meet water quality standards. Ecology is developing policies dealing with inadvertent pollution of wetlands caused by evasive volume and flows of discharges.

In response to the confusion surrounding wetlands protection and the need to develop a better system of regulation, EPA provided a grant to the departments of Ecology and Community, Trade and Economic Development (DCTED) for the State Wetland Integration Strategy (SWIS). The SWIS project gathered many stakeholders into six separate workgroups to address the most pressing issues surrounding wetlands protection - economics, education, regulatory reform, planning, technical issues and non-regulatory programs. Recommendations from the work groups are steering changes to improve the current system.

Wetlands protection continues to be complex, as new issues of water quality and quantity in wetlands arise. Growth and development continue to demand the conversion of natural landscapes for buildings, parking lots and other uses, making the protection of wetland's function a challenging task.

Management Measure Number IIA:
Protect Wetlands and Riparian Areas

Description from Federal Guidance

Protect from adverse effects wetlands and riparian areas that are serving a significant NPS abatement function and maintain this function while protecting the other existing functions of these wetlands and riparian areas as measured by characteristics such as vegetative composition and cover, hydrology of surface water and ground water, geochemistry of the substrate, and species composition.

1998 Findings from EPA and NOAA

The findings can be found in the general description of Loss of Aquatic Ecosystems.

Existing Statute(s) and Regulations

Growth Management Act (Chapter 36.70A RCW)
State Environmental Policy Act (Chapter 43.21C RCW)
Chapter 197-11 WAC
Environmental Mitigation (Chapter 90.74 RCW)
Shoreline Management Act (Chapter 90.58 RCW)

Description of Current Programs in Washington

The State Environmental Policy Act checklist has an extensive section on the impacts of projects on water bodies, especially wetlands and riparian areas. State policy requires that there be no net loss of environmental benefit from these areas, and requires substantial mitigation. Permits under the Hydraulic Code and Shoreline Management Act often contain conditions regarding protection and mitigation of wetlands and riparian areas. Further clarification and requirements are found in the Environmental Mitigation Act.

The Growth Management Act requires local governments to designate and protect critical areas, which included wetlands and riparian areas. Ordinances protecting these areas from degradation are also required of each city and county. In addition, county commissioners are authorized to purchase sensitive lands, including wetlands and riparian areas, for conservation purposes in RCW 36.32.570.

The Department of Community Trade and Economic Development oversees implementation of the Growth Management Act. However, the act itself is implemented at the local level. Also implemented at the local level is the SEPA, Shoreline Management, and environmental mitigation, including protecting wetlands.

The State provides technical and financial assistance to local governments to implement these State laws. However, assistance is given through request. Even though

Washington State has adequate laws and regulations, the ability to meet this management measure is directly related to staff and fiscal resources available to both local and state governments. No guarantees can be made that adequate funding will be available.

Additional needs to meet this management measure

None

Actions to satisfy this management measure

Adequate laws and regulations are in place and no additional actions are needed.

Additional actions to improve water quality

None needed

Management Measure IIB:
Restore Wetlands and Riparian Areas

Description from Federal Guidance

Promote the restoration of the pre-existing functions in damaged and destroyed wetlands and riparian systems in areas where the systems will serve a significant NPS pollution abatement function.

1995 Finding from EPA and NOAA

The findings can be found in the general description of Loss of Aquatic Ecosystems.

Existing Statute(s) and Regulations

State Environmental Policy Act (Chapter 43.21C RCW)
    Chapter 197-11 WAC
Environmental Restoration Act (Chapter 43.21J RCW)
Salmon Recovery Act (Chapter 75.46 RCW)
Shoreline Management Act (Chapter 90.58 RCW)
    Chapter 173-16 RCW
Environmental Mitigation (Chapter 90.74 RCW)
Wetlands Mitigation Banking (Chapter 90.84 RCW)

Description of Current Program

The State Environmental Policy Act checklist has an extensive section on the impacts of projects on water bodies, especially wetlands and riparian areas. State policy requires that there be no net loss of environmental benefit from these areas, and requires substantial mitigation. Permits under the Hydraulic Code and Shoreline Management Act often contain conditions regarding protection and mitigation of wetlands and riparian areas. Further clarification and requirements are found in the Environmental Mitigation Act.

The Growth Management Act requires local governments to designate and protect critical areas, which included wetlands and riparian areas. Ordinances protecting these areas from degradation are also required of each city and county. In addition, county commissioners are authorized to purchase sensitive lands, including wetlands and riparian areas, for conservation purposes in RCW 36.32.570.

The Department of Community Trade and Economic Development oversees implementation of the Growth Management Act. However, the act itself is implemented at the local level. Also implemented at the local level is the SEPA, Shoreline Management, and environmental mitigation, including wetlands protection.

The State provides technical and financial assistance to local governments to implement these State laws. However, assistance is given through request. Even though Washington State has adequate laws and regulations, the ability to fully protect and restore state wetlands is directly related to staff and fiscal resources available to both local and state governments. No guarantees can be made that adequate funding will be available.

Active restoration programs exist for both wetlands and riparian areas within Washington. Wetlands restoration generally is a result of mitigation from development projects. Projects must restore or replace two acres of wetlands for every acre degraded, providing a net environmental benefit. In addition, agencies and businesses can combine mitigation requirements to create large, environmentally significant wetlands under Wetlands Mitigation Banking. This is expected to increase the functionality of the state's wetlands over piecemeal mitigation.

Ecology is currently implementing a watershed-based wetlands restoration projects for Puget Sound river basins. This effort identifies potential wetland restoration sites and the functions each site could provide, if restored. As watersheds or locally based restoration programs are implemented, this information will be integrated with other water quality and habitat objectives.

Many groups across the state are involved in riparian restoration. Five State agencies currently provide grants to local groups:

- Conservation Commission (Fishers' Habitat Grants and grants to local conservation districts)
- Department of Ecology (Centennial Clean Water Grants)
- Department of Natural Resources (Jobs for the Environment)
- Department of Fish and Wildlife (Fish Habitat Restoration Grants)
- Interagency Committee for Outdoor Recreation (Riparian Restoration Grants)

A key tool to further implement on agricultural lands is the CREP program administered by the NRCS. Over $200 million is available to assist landowners with restoration efforts in riparian areas.

A recent study was done gauging the effectiveness of the Jobs for the Environment program, which has existed for about five years. Within this time, this program has:

- administered over $20 million in grants for riparian restoration
- replaced 283 culverts, opening 173 of upstream fish habitat
- placed 3,291 large woody debris/habitat structures
- built 252 miles of riparian and pasture fencing
- planted 769 miles of riparian areas
- stormproofed or "put to bed" 501 miles of roads

It is expected that riparian restoration will increase under the Salmon Recovery Act.

The Puget Sound Plan has three goals for Wetlands and Fish and Wildlife Habitat Protection:

- Establish and coordinate federal, tribal, state, and local programs to protect wetlands and habitat.
- In the short term, achieve no net loss of wetlands function and acreage of aquatic, riparian, and other habitat important to water quality protection.
- In the long term, achieve a measurable net gain of wetlands function and acreage and a net gain of aquatic and riparian habitat and other habitat important to water quality protection.

Additional needs to meet this management measure

None

Actions to satisfy this management measure

Adequate laws and regulations are in place and no additional actions are needed.

Additional actions to improve water quality

None needed

Management Measure Number IIC:
Vegetative Treatment Systems

Description from Federal Guidance

Promote the use of engineered vegetated treatment systems such as constructed wetlands or vegetated filter strips where these systems will serve a significant NPS pollution abatement function.

Findings from EPA and NOAA

The findings can be found in the general description of Loss of Aquatic Ecosystems.

Existing Statute(s) and Regulations

Growth Management Act (Chapter 36.70A RCW)
State Environmental Policy Act (Chapter 43.21C RCW)
    Chapter 197-11 WAC
Environmental Restoration Act (Chapter 43.21J RCW)
Hydraulic Code (Chapter 75.20 RCW)
    Chapter 220-110 WAC
Shoreline Management Act (Chapter 90.58 RCW)
    Chapter 173-16 RCW
Draft State Stormwater Manual

Description of Current Program

Washington State promotes the use of intact riparian areas, wetlands, and natural buffers for helping to protect surface water from polluted runoff. However, in place in Washington State is an antidegradation policy that prohibits polluted discharges into state's waters, including wetlands. Thus the use of wetlands and riparian areas as treatment systems is limited.

Aside from the above, the state does promote the use of bioengineering for constructed wetlands. Bio-engineering is defined as using trees, shrubs, and other natural vegetation, a definition essentially similar to the "vegetative treatment systems" in this management measure. This preference is reflected in reviews under the State Environmental Policy Act, as well as permits under the Hydraulic Code and Shoreline Management Act.

> "Bio-engineering is the preferred method of bank protection where practicable." WAC 220-110-080

Washington State's water quality standards are used by Ecology to protect and maintain beneficial uses when issuing permits (such as National Pollutant Discharge Elimination System (NPDES) permits that set limits on discharges to surface waters), conditioning permits (such as federal permits affecting state waters), and reviewing proposed projects

to ensure that water quality of surface waters is protected. These responsibilities usually are carried out on a site-specific basis when reviewing individual projects or permit applications. These permits and reviews cover a wide range of activities, including discharging wastewater and stormwater, filling wetlands, construction activities requiring short-term standards modifications, aquatic herbicide applications, activities reviewed under the State Environmental Policy Act (SEPA), and activities regulated under the Shoreline Management Act.

Ecology staff, in issuing permits and reviewing development projects, determine if the project or permit will meet the water quality standards. These guidelines assist the project reviewer in making that determination for proposed projects that will affect wetlands. Further, the guidelines aim to ensure the equitable and consistent regulation of activities which have the potential to degrade or destroy the water quality of a wetland. Consistent application of the water quality standards on a statewide basis will contribute to the protection of the state's important wetland resource.

Publication #92-10, Wetland Buffers: Use and Effectiveness, is a report that summarizes and evaluates scientific literature, an agency survey, and a recent field study on the use and effectiveness of vegetated wetland buffer zones in reducing the impact of adjacent land use on wetland ecosystems. Published literature was obtained from several sources and contains information from throughout the country on the concept of wetland buffers, their important functions, effective buffer widths, and buffer determination models. The agency survey reviewed buffer requirements of several states throughout the U.S. and for counties and cities in Washington. The field study reviewed the current state of buffers at several sites in King and Snohomish counties. The report is available to local governments and others interested in using wetland buffers for ecosystem protection.

Additional needs to meet this management measure

None needed

Actions to satisfy this management measure

Adequate programs and processes are in place to satisfy this management measure.

Additional actions to improve water quality

No additional actions are necessary to implement this management measure.

LAKES

There are no specific management measures to address under 6217. However, Washington is actively engaged in lake management.

BACKGROUND

The need for a guaranteed, ongoing lake program is validated by increasing requests from local citizens for assistance for a myriad of lake associated problems. Local sponsors continue to submit applications for grant funds for Phase I and Phase II projects. Ecology's lake restoration program modeled after EPA's discontinued Clean Lakes Program has proven to be a very effective approach for solving in-lake and lake-associated watershed problems.

By carefully adhering to the guidance of the lake restoration program, the requirements of establishing TMDLs have been fulfilled. Criteria and loading rates have been set and the in-lake and watershed methods for achieving and maintaining the criteria have been adopted by the local sponsors.

Grant funds for cleaning up lakes are now available through EPA 319 nonpoint funds and the Centennial Clean Water Fund. Since federal Clean Lakes Funds (Section 314) have not been appropriated by Congress since 1995, EPA has provided guidance that makes it very clear that the states should utilize 319 funds for Phase I and Phase II lake restoration projects.

A dependable source of lake restoration funds has shown far-reaching benefits for lake programs throughout the state. The drying up of funding from both 314 and the state has resulted in counties reducing their lake activities staff, state universities paring back their limnology and lake management programs, and a reduction in momentum for new projects throughout the state. Also, the regular funding of lake restoration projects has proven been a very effective 'seed' source for projects around the state. During years when funding prospects were good, applicants included Indian tribes, conservation districts, sewer and water districts, special use districts, counties, state agencies and universities. Currently, the only applicants are the two or three larger counties that can afford to fund ongoing lake outreach programs.

LAKE MANAGEMENT AND NONPOINT POLLUTION

Much work has been done to remove fecal contamination, metals and other contaminants from point sources discharging to streams. However, there has been relatively little focus on phosphorus loading to lakes and streams. Relatively high concentrations of phosphorus may not cause chemical or biological upsets of the streams. However, as soon as streams enter lakes, the longer water residence time and high available light allow algae to rapidly grow to their full potential, taking advantage of all the nutrients available. While streams are in a constant flushing mode, lakes act like a sink, storing phosphorus in the sediments that can later recycle back into the water column.

As lakes have become more and more impacted by anthropogenic sources, the need to monitor their water quality has become more important. Lake water quality data come from various county monitoring programs, Ecology's volunteer lake monitoring program, Ecology's intensive lake monitoring program and Phase I and II Lake Restoration projects (initiated prior to 1995).

EFFORTS TO IMPROVE LAKE WATER QUALITY

There needs to be a concerted effort to implement WAC 173-201A-030(6), the establishment of lake nutrient (phosphorus) criteria. Establishment of criteria for individual lakes will provide a sounder and more legally defensible baseline, which will trigger protective mechanisms for those lakes when the numeric criteria are violated.

Besides the need to correct existing lake water quality problems, there is also the opportunity for comprehensive planning at the local level to protect lakes against impacts from future watershed developments. Prevention of problems will always be much more practical and less expensive than treatment of an existing problem.

A statewide lakes management program would address these needs:

- continuance of Ecology's volunteer and intensive monitoring program;
- development of a comprehensive utilization of monitoring data to help direct the future course of lake protection efforts;
- establishment of a coordinated education program;
- comprehensive plans to protect lakes against development pressures;
- implementation of the ecoregional phosphorus criteria;
- development of TMDLs for completed lake restoration projects;
- a centrally-located clean lakes coordinator;
- funding for Phase II (implementation) projects which have completed Phase I (planning) projects; and
- funding for lakes that have been degraded or are in danger of being degraded, by nutrients from either the watershed or in-lake recycling.

Additional Actions to Improve Water Quality

- Develop and implement a statewide lakes management program using the needs identified above (LAE 5)

Estuaries and Nearshore

There are no specific management measures to address under 6217, however, Washington State is actively engaged in management of estuarine and nearshore environments.

Background

A description of estuaries and nearshore can be found in Chapter 2. This section will detail some of the reasons for the loss of estuaries and nearshore habitat.

Of the state's 3700 miles of shoreline, more than 800 miles in Puget Sound have been modified by human development, causing a decline in the acreage of the nearshore and its overall health. Residential and commercial development at the shoreline has a tremendous effect on the nearshore. Clearing vegetation from the shoreline and immediate upland areas contributes to erosion problems and increases the amount of surface water runoff.

In Nearshore Habitat Loss in Puget Sound: Recommendations for Improved Management (Brian Lynn, 1998), a number of factors were identified that contributed to habitat loss:

- shoreline armoring
- landfilling
- diking and channeling
- dredging
- in-water structures
- clearing and grading
- nutrient enrichment
- exotic species
- water pollution
- shifts in water flow regimes
- recreational harvest

Nonpoint Pollution and Estuary Management

Some of the problems associated with these include: beach erosion, physically displacing and destroying algae and other marine vegetation, change in salinity and water regimes, reduction of species abundance, displacement of native species, and contamination and degradation of nearshore habitats resulting in loss of food source and cover. There are a number of other problems generated by the above list.

Source Control Strategy

The National Estuary Program was established in 1987 by amendments to the Clean Water Act to identify, restore, and protect nationally significant estuaries of the United

States. Unlike traditional regulatory approaches to environmental protection, the NEP targets a broad range of issues and engages local communities in the process. The program focuses not just on improving water quality in an estuary, but on maintaining the integrity of the whole system -- its chemical, physical, and biological properties, as well as its economic, recreational, and aesthetic values.

The National Estuary Program is designed to encourage local communities to take responsibility for managing their own estuaries. Each NEP is made up of representatives from federal, State and local government agencies responsible for managing the estuary's resources, as well as members of the community -- citizens, business leaders, educators, and researchers. These stakeholders work together to identify problems in the estuary, develop specific actions to address those problems, and create and implement a Comprehensive Conservation and Management Plan (CCMP) for protecting the estuary and its resources.

In Washington**,** two estuaries are part of the NEP: The Puget Sound and the Lower Columbia River. The Puget Sound Management Plan and The Lower Columbia River Estuary Plan have both been approved as a Comprehensive Conservation and Management Plan. Other estuaries in need of planning are the Willapa Bay and Grays Harbor estuaries.

Additional Actions to Improve Water Quality

The statewide nonpoint plan has adopted a number of Salmon Recovery early actions that pertain to estuary management.

Education and Building Stewardship

Education about nonpoint pollution is a challenge. It must target both specific and general audiences. It should inform and inspire. It needs to reach youth and adults.

Description of Current Program

Nonpoint education comes from many current sources - local governments, State agencies, Cooperative Extension, conservation districts, nonprofit organizations. For voluntary BMPs, education is our most effective tool, indeed our only tool to raise people's awareness and change their behavior.

Additional Actions to Improve Water Quality

With input from the many entities who successfully conduct nonpoint education, both formal (K-12) and informal ("public" education), Ecology has compiled a list of activities and projects that we recommend adding to our current efforts, mostly within the next five years.

To implement these ideas, we will need to find a secure source of funding that's larger than current levels. Many of these recommendations come from the Salmon Recovery Plan Early Actions.

Program development

- Develop a resource library of model materials and success stories.
- Distribute or provide easy access to information on funding sources for salmon recovery and on funds expended on salmon recovery efforts.
- Implement the H_2O Home to Ocean program similar to a program currently in California, which educates the public about wise use and proper disposal of pesticides.
- Develop and implement site-specific public education plans for parks with significant salmon resources.

Programs for schools

- Conduct a series of watershed-specific PROJECT WET teacher workshops on Watersheds for People and Salmon, focusing on pollution prevention, water conservation, habitat, and public health.
- Complete Columbia Watershed curriculum for youth and adults, for better understanding and stewardship in the Columbia Basin

- Expand “Magic Apple” grants to fund exemplary teachers’ water quality class projects.

- Sponsor one new community Water Festival per year, for 4th graders.

Public education programs

- Manage the Puget Sound Public Involvement and Education “PIE” fund program to develop innovative education programs.

- Fund small water quality education grants statewide.

- Produce outreach campaigns and materials for narrowly focused groups such as septic system owners - establish awards programs where appropriate, to tell “success stories.”

- Develop and disseminate educational materials, fact sheets, and other items.

Volunteer Programs

- Introduce and support Master Watershed Steward programs throughout the state.

- Develop and implement education/outreach and volunteers strategy.

- Support Watch over Washington’s website for volunteer monitors and provide technical help to local groups and classrooms.

- Train, direct, and equip volunteer monitors.

- Establish an online, central repository for volunteers’ data of known quality.